	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20030001831 A1	20030102	23	Driving circuit for electrooptical device, electrooptical device, and electronic apparatus	345/204	
2	US 20020196208 A1	20021226	34	Display	345/55	
3	US 20020158857 A1	20021031	49	System and methods for driving an electrooptic device	345/204	
4	US 20020158830 A1	20021031	28	Liquid crystal shutter	345/96	
5	US 20020126071 A1	20020912	48	Driving method and device of electro-optic element, and electronic equipment	345/60	
6	US 20020084970 A1	20020704	38	Liquid crystal display device, driving circuit, driving method, and electronic apparatus	345/96	
7	US 20020075216 A1	20020620	30	Liquid crystal display device and method of driving the same	345/89	
8	US 20020036608 A1	20020328	60	Liquid crystal display device having an improved lighting device	345/87	
9	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98	
10	US 20010050799 A1	20011213	33	Electro-optical device, method for making the same, and electronic apparatus	359/245	359/252; 359/253; 359/254
11	US 6448953 B1	20020910	22	Driving circuit for electrooptical device, electrooptical device, and electronic apparatus	345/98	345/100; 345/204

01/07/2003, EAST Version: 1.03.0002

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
12	US 6219113 B1	20010417	289	Method and apparatus for driving an active matrix display panel	349/42	345/98; 349/43; 349/45
13	US 6108065 A	20000822	43	Parallel field liquid crystal display with counter electrodes connected to the scan lines	349/141	349/46
14	US 6061117 A	20000509	39	Liquid crystal device having a polymer wall on another wall and surrounding a liquid crystal region and method for fabricating the same	349/156	349/135; 349/86; 349/92; 349/94
15	US 6046790 A	20000404	50	LCD device having relationship between spontaneous polarization and capacitance	349/172	349/174; 349/33; 349/38
16	US 5831707 A	19981103	44	Active matrix type liquid crystal display apparatus	349/141	349/39
17	US 5677744 A	19971014	24	Reflection type input/output liquid crystal display	349/12	345/104; 349/143; 349/162; 349/48
18	US 5673092 A	19970930	39	Liquid crystal device and method for fabricating the same	349/86	349/84; 349/89; 349/90
19	US 5631752 A	19970520	35	Antiferroelectric liquid crystal display element exhibiting a precursor tilt phenomenon	349/173	349/172
20	US 5619234 A	19970408	40	Ink-jet recording apparatus which allows shifting or changing of ink position or direction	347/55	347/13
21	US 5490000 A	19960206	28	Deformed helix ferroelectric liquid crystal display device and method of driving	349/33	349/171; 349/49

01/07/2003, EAST Version: 1.03.0002

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
22	US 5227900 A	19930713	14	Method of driving ferroelectric liquid crystal element	345/97	349/172; 349/37; 349/85

01/07/2003, EAST Version: 1.03.0002

United States Patent [19]

Ota et al.

[11] **Patent Number:** **6,108,065**

[45] **Date of Patent:** *Aug. 22, 2000

[54] **PARALLEL FIELD LIQUID CRYSTAL DISPLAY WITH COUNTER ELECTRODES CONNECTED TO THE SCAN LINES**

[75] Inventors: **Masuyuki Ota**, Mobara; **Masahiko Ando**, Hitachi; **Katsumi Kondo**, Hitachinaka; **Masahito Ohe**, Hitachi; **Kazuhiko Yanagawa**, Mobara, all of Japan

[73] Assignee: **Hitachi, Ltd.**, Tokyo, Japan

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/179,859**

[22] Filed: **Oct. 28, 1998**

Related U.S. Application Data

[63] Continuation of application No. 08/519,101, Aug. 24, 1995, Pat. No. 5,831,707.

[30] **Foreign Application Priority Data**

Aug. 24, 1994 [JP] Japan 6-199247
May 30, 1995 [JP] Japan 7-131404

[51] Int. Cl.[7] G02F 1/136
[52] U.S. Cl. 349/141; 349/46
[58] Field of Search 349/141, 38, 39, 349/111, 44, 46

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,345,249	8/1982	Togashi	345/103
4,386,352	5/1983	Nonomura et al.	345/92
4,759,610	7/1988	Yanagisawa	349/162

4,984,033	1/1991	Ishizu et al.	349/111
5,028,122	7/1991	Hamada et al.	349/38
5,266,825	11/1993	Tsukada et al. .	
5,576,867	11/1996	Baur et al.	349/142
5,598,285	1/1997	Kondo et al. .	
5,644,147	7/1997	Yamazaki et al. .	
5,773,325	6/1998	Teramoto	438/151
5,831,707	11/1998	Ota et al.	349/141
5,841,498	11/1998	Baur et al.	349/141

FOREIGN PATENT DOCUMENTS

|		
63-21907	of 1988	Japan .
1-136120	of 1989	Japan .
5-505247	of 1993	Japan .

Primary Examiner—Kenneth Parker
Attorney, Agent, or Firm—Antonelli, Terry, Stout & Kraus, LLP

[57] **ABSTRACT**

An active matrix type liquid crystal display apparatus includes a first substrate which has a plurality of scan electrodes and signal electrodes formed in a matrix shape, and a plurality of semiconductor switching elements having enhancement type characteristics formed at corresponding cross points of said scan electrodes and said signal electrodes, respectively, a second substrate which is arranged so as to face to said first substrate, and a liquid crystal layer which is composed of a liquid crystal composition enclosed in an interval between said first and second substrates, wherein plural pixel electrodes connected to corresponding ones of said semiconductor switching element and counter electrodes connected to corresponding ones of said scan electrodes are arranged alternately in a comb-shape manner in respective ones of plural pixel regions surrounded by said plural scan electrodes and plural signal electrodes on said first substrate.

22 Claims, 29 Drawing Sheets
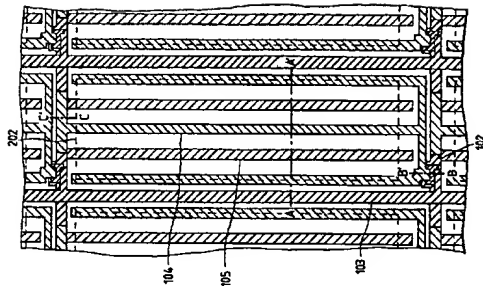
	Document ID	Issue Date	Pages	Title	Current OR
1	US 20020180673 A1	20021205	108	Display device method of driving same and electronic device mounting same	345/87
2	US 20020171613 A1	20021121	72	Liquid crystal display device with influences of offset voltages reduced	345/87
3	US 20020158857 A1	20021031	49	System and methods for driving an electrooptic device	345/204
4	US 20020158830 A1	20021031	28	Liquid crystal shutter	345/96
5	US 20020154104 A1	20021024	33	Method for driving electrooptical device, driving circuit, and electrooptical device, and electronic apparatus	345/204
6	US 20020154083 A1	20021024	17	Display device and method of driving same	345/89
7	US 20020084970 A1	20020704	38	Liquid crystal display device, driving circuit, driving method, and electronic apparatus	345/96
8	US 20020075216 A1	20020620	30	Liquid crystal display device and method of driving the same	345/89
9	US 20020067328 A1	20020606	81	VOLTAGE GENERASTING CIRCUIT, SPATIAL LIGHT MODULATING ELEMENT, DISPLAY SYSTEM, AND DRIVING METHOD FOR DISPLAY SYSTEM	345/92
10	US 20020036608 A1	20020328	60	Liquid crystal display device having an improved lighting device	345/87
11	US 20020024511 A1	20020228	56	System and method for driving an electro-optical device	345/204

	Document ID	Issue Date	Pages	Title	Current OR
12	US 20010013852 A1	20010816	20	LIQUID CRYSTAL DISPLAY DEVICE	345/92
13	US 6476791 B2	20021105	53	Peripheral driver circuit of liquid crystal electro-optical device	345/100
14	US 6396468 B2	20020528	21	Liquid crystal display device	345/87
15	US 6388653 B1	20020514	70	Liquid crystal display device with influences of offset voltages reduced	345/98
16	US 6295047 B1	20010925	53	Peripheral driver circuit of liquid crystal electro-optical device	345/100
17	US 6246385 B1	20010612	77	Liquid crystal display device and its driving method	345/87
18	US 6081250 A	20000627	13	Active matrix display device and its driving method	345/94
19	US 6069600 A	20000530	45	Active matrix type liquid crystal display	345/87
20	US 5646643 A	19970708	62	Liquid crystal display device	345/100
21	US 5619221 A	19970408	61	Liquid crystal display device	345/58
22	US 5585950 A	19961217	46	STN LCD device displaying multiple colors in response to different voltages which includes a retardation plate	349/118
23	US 5434599 A	19950718	64	Liquid crystal display device	345/100
24	US 5424752 A	19950613	40	Method of driving an electro-optical device	345/92

	Document ID	Issue Date	Pages	Title	Current OR
25	US 5349366 A	19940920	21	Electro-optical device and process for fabricating the same and method of driving the same	345/92

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	24517	counter adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
2	BRS	L2	17161	pixel adj electrode$2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
3	BRS	L3	754	voltage near 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
4	BRS	L4	212	1 and 2 and 3	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
5	BRS	L5	109468	pulse adj width	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
6	BRS	L6	11343	column near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
7	BRS	L7	133712	signal near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
8	BRS	L8	66995	data near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
9	BRS	L9	2982	data near electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
10	BRS	L10	10815	signal near electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
11	BRS	L11	2736	column near electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
12	BRS	L12	206496	6 or 7 or 8 or 9 or 10 or 11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
13	BRS	L13	12868	5 and 12	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
14	BRS	L14	22	4 and 13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
15	BRS	L15	16605	driving adj method	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
16	BRS	L16	86509	input adj voltage	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
17	BRS	L17	3419	(345/87-89).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
18	BRS	L18	659	(345/92).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
19	BRS	L19	834	(345/94).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
20	BRS	L20	360	(345/96).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
21	BRS	L21	244	(345/101).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
22	BRS	L22	1097	(345/204).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
23	BRS	L23	493	(345/208-209).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
24	BRS	L24	6359	17 or 18 or 19 or 20 or 21 or 22 or 23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
25	BRS	L25	282	15 and 12 and 1 and 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
26	BRS	L26	103	24 and 25	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
27	BRS	L27	25	5 and 26	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	27153	driving near method	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
2	BRS	L2	224837	LCD or "liquid crystal display"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
3	BRS	L3	5610	1 and 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
4	BRS	L4	15766	phase adj modulation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
5	BRS	L5	28860	gate adj voltage	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
6	BRS	L6	2103	scanning adj pulse	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
7	BRS	L7	4	resistance near on	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
8	BRS	L8	109468	pulse adj width	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
9	BRS	L9	22569	modulation near 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
10	BRS	L10	84159	phase near difference	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
11	BRS	L11	210386	waveform	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
12	BRS	L12	14155	10 and 11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Type	L #	Hits	Search Text	DBs
13	BRS	L13	30901	5 or 6	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
14	BRS	L14	109	4 and 13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
15	BRS	L15	1	3 and 14	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
16	BRS	L16	32379	scanning near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
17	BRS	L17	9575	row near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
18	BRS	L18	11343	column near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
19	BRS	L19	133712	signal near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
20	BRS	L20	66995	data near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
21	BRS	L21	12937	(16 or 17) and (18 or 19 or 20)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
22	BRS	L22	20929	phase near shifting	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
23	BRS	L23	30145	PWM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
24	BRS	L24	50753	22 or 23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
25	BRS	L25	283	21 and 24	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
26	BRS	L26	564	345/55.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
27	BRS	L27	3419	(345/87-89).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
28	BRS	L28	659	(345/92).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
29	BRS	L29	834	(345/94).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
30	BRS	L30	981	(345/98).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
31	BRS	L31	244	(345/101).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
32	BRS	L32	360	(345/96).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
33	BRS	L33	366	(345/208).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
34	BRS	L34	133	(345/209).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
35	BRS	L35	6059	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
36	BRS	L36	36	25 and 35	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Type	L #	Hits	Search Text	DBs
37	BRS	L37	13526	pixel adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
38	BRS	L38	20071	common adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
39	BRS	L39	24517	counter adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
40	BRS	L40	5010	37 and (38 or 39)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
41	BRS	L41	46	24 and 40	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
42	BRS	L43	201505	tone or greyscale or grayscale or gradation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
43	BRS	L44	726	40 and 43	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
44	BRS	L45	7	23 and 44	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
45	BRS	L46	1436	4 and 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
46	BRS	L48	77668	phase adj shift	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
47	BRS	L49	4	21 and 23 and 48	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
48	BRS	L50	560	unequal adj intervals	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

Type	L #	Hits	Search Text	DBs
BRS	L51	2	44 and 50	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

49

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98	
2	US 6483497 B1	20021119	62	Matrix display with signal electrode drive having memory	345/100	345/103
3	US 5900856 A	19990504	64	Matrix display apparatus, matrix display control apparatus, and matrix display drive apparatus	345/100	
4	US 5646670 A	19970708	57	Color image forming apparatus which reduces toner consumption during image formation	347/131	347/254

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	27153	driving near method	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
2	BRS	L2	224837	LCD or "liquid crystal display"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
3	BRS	L3	5610	1 and 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
4	BRS	L4	15766	phase adj modulation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
5	BRS	L5	28860	gate adj voltage	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
6	BRS	L6	2103	scanning adj pulse	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
7	BRS	L7	4	resistance near on	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
8	BRS	L8	109468	pulse adj width	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
9	BRS	L9	22569	modulation near 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
10	BRS	L10	84159	phase near difference	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
11	BRS	L11	210386	waveform	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
12	BRS	L12	14155	10 and 11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
13	BRS	L13	30901	5 or 6	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
14	BRS	L14	109	4 and 13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
15	BRS	L15	1	3 and 14	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
16	BRS	L16	32379	scanning near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
17	BRS	L17	9575	row near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
18	BRS	L18	11343	column near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
19	BRS	L19	133712	signal near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
20	BRS	L20	66995	data near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
21	BRS	L21	12937	(16 or 17) and (18 or 19 or 20)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
22	BRS	L22	20929	phase near shifting	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
23	BRS	L23	30145	PWM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
24	BRS	L24	50753	22 or 23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
25	BRS	L25	283	21 and 24	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
26	BRS	L26	564	345/55.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
27	BRS	L27	3419	(345/87-89).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
28	BRS	L28	659	(345/92).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
29	BRS	L29	834	(345/94).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
30	BRS	L30	981	(345/98).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
31	BRS	L31	244	(345/101).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
32	BRS	L32	360	(345/96).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
33	BRS	L33	366	(345/208).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
34	BRS	L34	133	(345/209).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
35	BRS	L35	6059	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
36	BRS	L36	36	25 and 35	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
37	BRS	L37	13526	pixel adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
38	BRS	L38	20071	common adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
39	BRS	L39	24517	counter adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
40	BRS	L40	5010	37 and (38 or 39)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
41	BRS	L41	46	24 and 40	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
42	BRS	L43	201505	tone or greyscale or grayscale or gradation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
43	BRS	L44	726	40 and 43	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
44	BRS	L45	7	23 and 44	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
45	BRS	L46	1436	4 and 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
46	BRS	L48	77668	phase adj shift	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
47	BRS	L49	4	21 and 23 and 48	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98	
2	US 6498596 B1	20021224	75	Driving circuit for display device and liquid crystal display device	345/98	341/144; 341/150

01/07/2003, EAST Version: 1.03.0002

	Document ID	Issue Date	Pages	Title	Current OR
1	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98

#	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20020149556 A1	20021017	36	Liquid crystal display apparatus, driving method therefor, and display system	345/98	
2	US 20020145602 A1	20021010	37	LIQUID CRYSTAL DISPLAY APPARATUS, DRIVING METHOD THEREFOR, AND DISPLAY SYSTEM	345/213	345/98
3	US 20020145578 A1	20021010	28	Liquid crystal display elements driving method and electronic apparatus	345/87	
4	US 20020118158 A1	20020829	29	Display apparatus	345/89	345/690
5	US 20020067328 A1	20020606	81	VOLTAGE GENERASTING CIRCUIT, SPATIAL LIGHT MODULATING ELEMENT, DISPLAY SYSTEM, AND DRIVING METHOD FOR DISPLAY SYSTEM	345/92	
6	US 20020036608 A1	20020328	60	Liquid crystal display device having an improved lighting device	345/87	
7	US 20020030647 A1	20020314	19	Uniform active matrix oled displays	345/82	345/83; 345/92
8	US 20020015016 A1	20020207	29	Liquid crystal display controller	345/87	
9	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98	
10	US 20010038371 A1	20011108	24	Liquid crystal display apparatus	345/87	
11	US 20010017610 A1	20010830	21	Electro-optical device, driving circuit and driving method of electro-optical device, and electronic apparatus	345/100	345/87; 345/92; 349/41

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
12	US 20010011988 A1	20010809	81	Liquid crystal display with liquid crystal driver having display memory	345/98	
13	US 6424331 B1	20020723	48	Driving circuit for electro-optical device, driving method therefor, DA converter, signal line driving circuit, electro-optical panel, projection type display device, and electronic equipment	345/98	341/144; 341/150
14	US 6414669 B1	20020702	49	Driving method and apparatus for liquid crystal display device	345/98	345/100; 345/101; 345/102; 345/103; 345/104; 345/99
15	US 6384806 B1	20020507	35	Digital driver circuit for electro-optical device and electro-optical device having the digital driver circuit	345/89	345/691; 345/95
16	US 6377235 B1	20020423	33	Drive circuit for electro-optic apparatus, method of driving the electro-optic apparatus, electro-optic apparatus, and electronic apparatus	345/100	345/92; 377/69; 377/78
17	US 6326942 B1	20011204	34	Optical spatial modulation device and image display apparatus	345/98	345/87; 345/99
18	US 6281826 B1	20010828	97	Voltage generating apparatus	341/150	341/144; 345/89

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
19	US 6243055 B1	20010605	65	Optical display system and method with optical shifting of pixel position including conversion of pixel layout to form delta to stripe pattern by time base multiplexing	345/32	345/600; 345/694; 345/88; 348/762; 349/145; 349/196; 359/156; 359/495
20	US 6222518 B1	20010424	79	Liquid crystal display with liquid crystal driver having display memory	345/98	345/100
21	US 6147664 A	20001114	23	Controlling the brightness of an FED device using PWM on the row side and AM on the column side	345/74.1	315/169.1; 345/100; 345/102; 345/76; 345/98
22	US 6057818 A	20000502	11	Liquid crystal display driven by raised cosine drive signal	345/94	345/100; 345/208; 345/210
23	US 6040827 A	20000321	28	Driver circuit, driver integrated circuit, and display device and electronic device using the driver circuit and driver integrated circuit	345/208	327/387; 345/100; 345/209
24	US 5953002 A	19990914	32	Driving method for a liquid crystal display device	345/204	345/690; 345/89
25	US 5815136 A	19980929	80	Liquid crystal display with liquid crystal driver having display memory	345/98	345/100
26	US 5815132 A	19980929	50	Liquid crystal display apparatus	345/95	345/103; 345/210; 345/89
27	US 5739803 A	19980414	33	Electronic system for driving liquid crystal displays	345/98	345/100; 345/89

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
28	US 5670973 A	19970923	40	Method and apparatus for compensating crosstalk in liquid crystal displays	345/58	345/100; 345/101
29	US 5657039 A	19970812	20	Display device	345/95	345/92
30	US 5621425 A	19970415	43	Liquid crystal display device	345/94	345/100
31	US 5602559 A	19970211	23	Method for driving matrix type flat panel display device	345/89	345/97
32	US 5519411 A	19960521	49	Liquid crystal display apparatus	345/89	345/103; 345/208; 345/95
33	US 5130703 A	19920714	46	Power system and scan method for liquid crystal display	345/94	345/211
34	US 5091784 A	19920225	55	Matrix type image display apparatus using non-interlace scanning system	348/589	345/634; 345/636; 345/87; 348/600; 348/607
35	US 5089812 A	19920218	19	Liquid-crystal display	345/89	345/596; 345/690
36	US 4021607 A	19770503	12	Video display system employing drive pulse of variable amplitude and width	348/800	315/169.4; 345/208; 345/691; 348/525; 348/687

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	27153	driving near method	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
2	BRS	L2	224837	LCD or "liquid crystal display"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
3	BRS	L3	5610	1 and 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
4	BRS	L4	15766	phase adj modulation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
5	BRS	L5	28860	gate adj voltage	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
6	BRS	L6	2103	scanning adj pulse	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
7	BRS	L7	4	resistance near on	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
8	BRS	L8	109468	pulse adj width	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
9	BRS	L9	22569	modulation near 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
10	BRS	L10	84159	phase near difference	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
11	BRS	L11	210386	waveform	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
12	BRS	L12	14155	10 and 11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Type	L #	Hits	Search Text	DBs
13	BRS	L13	30901	5 or 6	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
14	BRS	L14	109	4 and 13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
15	BRS	L15	1	3 and 14	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
16	BRS	L16	32379	scanning near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
17	BRS	L17	9575	row near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
18	BRS	L18	11343	column near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
19	BRS	L19	133712	signal near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
20	BRS	L20	66995	data near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
21	BRS	L21	12937	(16 or 17) and (18 or 19 or 20)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
22	BRS	L22	20929	phase near shifting	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
23	BRS	L23	30145	PWM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
24	BRS	L24	50753	22 or 23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Type	L #	Hits	Search Text	DBs
25	BRS	L25	283	21 and 24	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
26	BRS	L26	564	345/55.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
27	BRS	L27	3419	(345/87-89).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
28	BRS	L28	659	(345/92).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
29	BRS	L29	834	(345/94).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
30	BRS	L30	981	(345/98).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
31	BRS	L31	244	(345/101).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
32	BRS	L32	360	(345/96).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
33	BRS	L33	366	(345/208).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
34	BRS	L34	133	(345/209).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
35	BRS	L35	6059	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
36	BRS	L36	36	25 and 35	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20020126114 A1	20020912	52	System and method for driving a display device	345/212	
2	US 20020067328 A1	20020606	81	VOLTAGE GENERASTING CIRCUIT, SPATIAL LIGHT MODULATING ELEMENT, DISPLAY SYSTEM, AND DRIVING METHOD FOR DISPLAY SYSTEM	345/92	
3	US 20020036608 A1	20020328	60	Liquid crystal display device having an improved lighting device	345/87	
4	US 20020021483 A1	20020221	75	Method and circuit for driving electrophoretic display and electronic device using same	359/267	359/265; 359/273
5	US 20020008688 A1	20020124	75	Driving method of image display device, driving device of image display device, and image display device	345/98	
6	US 6067065 A	20000523	50	Method for modulating a multiplexed pixel display	345/94	345/204; 345/205; 345/89
7	US 6005558 A	19991221	52	Display with multiplexed pixels for achieving modulation between saturation and threshold voltages	345/204	345/205; 345/89; 345/94

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	27153	driving near method	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
2	BRS	L2	224837	LCD or "liquid crystal display"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
3	BRS	L3	5610	1 and 2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
4	BRS	L4	15766	phase adj modulation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
5	BRS	L5	28860	gate adj voltage	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
6	BRS	L6	2103	scanning adj pulse	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
7	BRS	L7	4	resistance near on	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
8	BRS	L8	109468	pulse adj width	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
9	BRS	L9	22569	modulation near 8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
10	BRS	L10	84159	phase near difference	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
11	BRS	L11	210386	waveform	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
12	BRS	L12	14155	10 and 11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
13	BRS	L13	30901	5 or 6	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
14	BRS	L14	109	4 and 13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
15	BRS	L15	1	3 and 14	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
16	BRS	L16	32379	scanning near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
17	BRS	L17	9575	row near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
18	BRS	L18	11343	column near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
19	BRS	L19	133712	signal near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
20	BRS	L20	66995	data near line	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
21	BRS	L21	12937	(16 or 17) and (18 or 19 or 20)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
22	BRS	L22	20929	phase near shifting	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
23	BRS	L23	30145	PWM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
24	BRS	L24	50753	22 or 23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Type	L #	Hits	Search Text	DBs
25	BRS	L25	283	21 and 24	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
26	BRS	L26	564	345/55.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
27	BRS	L27	3419	(345/87-89).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
28	BRS	L28	659	(345/92).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
29	BRS	L29	834	(345/94).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
30	BRS	L30	981	(345/98).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
31	BRS	L31	244	(345/101).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
32	BRS	L32	360	(345/96).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
33	BRS	L33	366	(345/208).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
34	BRS	L34	133	(345/209).ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
35	BRS	L35	6059	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
36	BRS	L36	36	25 and 35	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

01/07/2003, EAST Version: 1.03.0002

	Type	L #	Hits	Search Text	DBs
37	BRS	L37	13526	pixel adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
38	BRS	L38	20071	common adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
39	BRS	L39	24517	counter adj electrode	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
40	BRS	L40	5010	37 and (38 or 39)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
41	BRS	L41	46	24 and 40	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
42	BRS	L43	201505	tone or greyscale or grayscale or gradation	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
43	BRS	L44	726	40 and 43	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB
44	BRS	L45	7	23 and 44	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	US 20030001812 A1	20030102	12	Liquid crystal display and method for driving the same	345/94	
2	US 20020196246 A1	20021226	24	Image display device, image display controller, display control method, and signal supplying method	345/208	
3	US 20020093495 A1	20020718	15	Image display apparatus and driving method thereof	345/204	
4	US 20020089477 A1	20020711	22	Display apparatus, display apparatus driving method, and liquid crystal display apparatus driving method	345/87	
5	US 20020057245 A1	20020516	25	Display device and display method	345/87	
6	US 20020047836 A1	20020425	35	Active matrix display device	345/204	
7	US 20020000962 A1	20020103	22	Driving method for liquid crystal device	345/87	
8	US 20010052890 A1	20011220	24	Active matrix type display device	345/89	
9	US 20010040546 A1	20011115	33	Liquid crystal display device and its drive method	345/87	
10	US 20010022569 A1	20010920	62	In-plane field type liquid crystal display device comprising liquid crystal molecules with more than two kinds of reorientation directions	345/88	

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
11	US 6496170 B1	20021217	29	Liquid crystal apparatus	345/87	345/101; 345/204; 345/206; 345/214; 345/92; 345/93; 345/94; 345/97; 345/98; 345/99; 349/172; 349/174; 349/33; 349/38
12	US 6359607 B1	20020319	23	Display device and display method	345/94	345/204; 345/99
13	US 6320565 B1	20011120	11	DAC driver circuit with pixel resetting means and color electro-optic display device and system incorporating same	345/98	345/88; 345/94
14	US 6313818 B1	20011106	29	Adjustment method for active-matrix type liquid crystal display device	345/89	345/96
15	US 6246385 B1	20010612	77	Liquid crystal display device and its driving method	345/87	345/100; 345/204
16	US 6232938 B1	20010515	49	Liquid crystal display device with low power consumption and high picture quality	345/88	345/103; 345/204; 345/90; 349/74; 349/77; 349/78; 349/83
17	US 6229515 B1	20010508	43	Liquid crystal display device and driving method therefor	345/103	345/100; 345/209; 345/89; 345/96

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
18	US 6137465 A	20001024	10	Drive circuit for a LCD device	345/98	345/204
19	US 6028578 A	20000222	43	Active matrix type liquid crystal display system and driving method therefor	345/94	345/100
20	US 5898322 A	19990427	30	Logic circuit for liquid crystal display having pass-transistor logic circuitry and thin film transistors	326/113	257/E27.111; 326/103; 345/92
21	US 5854616 A	19981229	44	Active matrix type liquid crystal display system and driving method therefor	345/100	345/94
22	US 5844535 A	19981201	41	Liquid crystal display in which each pixel is selected by the combination of first and second address lines	345/92	345/103
23	US 5798744 A	19980825	23	Liquid crystal display apparatus	345/92	345/206
24	US 5784073 A	19980721	36	Electro-optical device and method of driving the same	345/537	345/554; 345/558; 345/92; 348/792
25	US 5666133 A	19970909	12	Method for driving liquid crystal display unit	345/100	345/90; 345/96
26	US 5526014 A	19960611	14	Semiconductor device for driving liquid crystal display panel	345/96	345/98
27	US 5506598 A	19960409	11	Active matrix substrate and a method for driving the same	345/92	345/94
28	US 5414442 A	19950509	37	Electro-optical device and method of driving the same	345/89	345/692
29	US 5398043 A	19950314	18	Driving method for a display device	345/94	345/92

	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
30	US 5349366 A	19940920	21	Electro-optical device and process for fabricating the same and method of driving the same	345/92	345/206; 349/37; 349/48
31	US 5300945 A	19940405	9	Dual oscillating drive circuit for a display apparatus having improved pixel off-state operation	345/92	349/38
32	US 5287205 A	19940215	39	Gradation method for driving liquid crystal device with ramp and select signal	349/174	345/89; 345/94; 349/42; 349/43; 349/85; 349/86
33	US 5280279 A	19940118	11	Driving circuit for producing varying signals for a liquid crystal display apparatus	345/38	345/208; 345/50; 345/84; 345/96
34	US 5200846 A	19930406	64	Electro-optical device having a ratio controlling means for providing gradated display levels	349/174	257/E29.151; 257/E29.277; 345/92; 345/94; 349/42; 349/43; 349/85; 349/86

01/07/2003, EAST Version: 1.03.0002